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IS 13909 (1993): Dimensions for PM Cores made of magnetic oxides and associated Parts [LITD 5: Semiconductor and Other Electronic Components and Devices]

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Indian Standard

DIMENSIONS OF PM-CORES MADE OF MAGNETIC OXIDES AND ASSOCIATED PARTS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Magnetic Components and Ferrite Materials Sectional Committee, LTD 13

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Magnetic Components and Ferrite Materials Sectional Committee had been approved by the Electronics and Telecommunication Division Council

PM-cores are so called because they are derived from pot cores and have cut cuts permitting the use of coil formers containing terminal pins for mounting on a modular printed wiring board

They are mainly intended for use in the field of professional and industrial electronic power applications such as switched mode power supplies (SMPS) radar pulse power transformers, broadband matching transformers for telecommunications, and for machine and traffic controls

For these applications the pot core shape gives the advantage compared with other shapes, of a relatively large cross section with correspondingly high magnetic flux which in turn permits wintings of fewer turns for a given power with the associated benefits of small leakage inductance and self-capacitance These cores also provide good screening easv mounting and enable precise airgaps to be ground

PM-cores are also of interest for new SMPS techniques involving higher powers at frequencies greater than 50 kHz, since because they possess relatively small openings, they stray field losses which increase with frequency are much smaller than with any E-core type

The present range of PM-cores contains five sizes four of which are suitable for mounting directly on a printed wiring board with a simple U-bolt The locations of the mounting pins for these cores and their numbering are specified they are at spacings of 2 modules (one module being either 2 50 mm or 2 54 mm) and their possible number varies from 14 to 20

The fifth and largest core is to heavy for mounting on a printed wiring board, and neither the number or location of its terminal pins, which are usually located within the cut-out of the core are specified This standard is based without any technical change on IEC document 51 (Secretariat) 237 Dimensions of PM cores made of magnetic oxides and associated parts', issued by International Electrotechnical Commission (IEC)

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 1960 'Rules for rounding off numerical values (*revised*)' The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

AMENDMENT NO. 1 APRIL 1999
TO
IS 13909 : 1993 DIMENSIONS OF PM-CORES MADE OF MAGNETIC OXIDES AND ASSOCIATED PARTS

(*Foreword, seventh para, second sentence*) — Substitute the following for the existing sentence

'This standard is based without any technical change, on IEC 1247 (1995) 'PM — Cores made of magnetic oxides and associated parts — Dimensions', issued by International Electrotechnical Commission.'

(LTD 13)

Reprography Unit, BIS New Delhi, India

Indian Standard

DIMENSIONS OF PM-CORES MADE OF MAGNETIC OXIDES AND ASSOCIATED PARTS

1 SCOPE

1.1 This standard specifies the dimensions that are of importance for mechanical interchangeability for a preferred range of PM-cores made of magnetic oxides, the principal dimensions for coil formers to be used with these cores and the locations of their terminal pins on a modular printed wiring grid in relation to the base outlines of cores.

NOTE — PM cores consist of two parts.

1.2 The use derived standards which give a more detailed specification of component parts whilst still permitting compliance with this standard is discussed in Annex A.

2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard:

IS No	*Title*
1105 : 1952	Methods for precise conversion of inch and metric dimensions to ensure interchangeability
7616 : 1974	Guide for calculation of the effective parameters of magnetic piece parts

3 CONVERSION SYSTEM

3.1 The original system is the metric system.

3.2 Toleranced dimensions have been converted by applying the rules in IS 1105 : 1952.

NOTE — For practical cases the converted dimensions will normally be given with not more than three decimal places. The conversion rules may however result in more then three decimal places in order to keep the tolerance loss at a minium. In general it is left to the bases of this standard to apply further rounding but such further rounding has been introduced where it would not cause the two original millimetre limits to be exceeded by more than 2.5 percent of the tolerance that is the difference between the two limits.

No rule is laid down for the conversion of the nominal value but in cases where the converted dimensions are given as a nominal dimensions with symmetrical tolerance, it is normal practice to state that nominal value with the same number of decimal placed as the limits.

3.3 Single limit millimetre dimensions (maximum or minimum) are converted by applying the appropriate conversion table of IS 1105 : 1952 and rounded to two more decimal places than the original value in a given column relating to a particular dimension.

4 PRIMARY STANDARDS

4.0 Compliance with the following requirements ensures mechanical interchangeability of complete assemblies and wound coil formers.

4.1 Dimensions of PM Cores

4.1.1 *Principal Dimensions*

The principal dimensions of PM cores shall be as given in Fig. 1 read with Table 1.

4.1.2 *Effective Parameter and A_{Min} Values*

The effective parameter and A_{Min} values for PM cores whose dimensions comply with **4.1.1** shall be as given in Table 2 (*see* IS 7616 : 1974 for the definition of these parameters and their calculation).

4.2 Dimensions of Coil-Formers

The principal dimensions of coil-formers shall be as given in Fig. 2 read with Table 3.

4.3 Pin Locations and Base Outlines

When coil formers are provided with pins intended for use in conjunction with a printed wiring board they shall be inserted in the thicker flange(s) and their location, numbering and relationship to the core base outline shall be as shown in Fig. 3 in which the bases are viewed from the pin side that is from the underside of the printed wiring board.

NOTES

1 The module designated *m* shown in the grid plan may be either 2.50 mm or 2.54 mm.

2 The largest core 114/93 is not intended to be mounted on terminal pins because of its weight. In this case pins are usually fitted within the cut out of the core.

4.4 Pin Diameter

Coil former terminations (pins) shall be accepted by a gauge having 1.2 mm holes on true position.

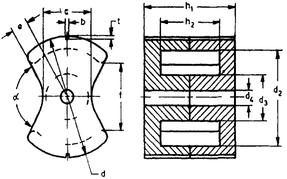


FIG 1 PM CORES

Table 1 Principal Dimensions of PM Cores

(*Clause* 4 1 1)

Size	PM 50 39	PM 62 49	PM 74/59	PM 87 70	PM 114 93	Units
	Max 50 1	62 0	74 0	87 0	114	mm
d₁	1 969	441	2 913	3 425	4 488	n
	M n 48 3	60 0	71 5	84 0	109 5	n
	1 902	2 362	815	3 307	4 311	n
	Max 40 3	50 3	59 3	69 2	91 7	n m
d_2	1 587	1 980	2 334	724	3 585	
	Min 39 0	48 8	57 5	67 1	88 0	
	1 535	1 921	264	2 64	3 465	
	Max 20 0	25 5	9 5	31 7	43 0	n
d_3	0 787	0 986	1 144	1 223	1 693	n
	M n 19 4	4 7	8 5	0 7	41 6	n n
	0 764	0 948	1 104	1 184	1 638	n
	Max 5 7	5 7	5 7	8 8	5 8	
d_4	0 2 4 4	0 224 4	0 2 4 4	0 346 5	0 2 8 4	
	M n 5 4	5 4	5 4	8 5	5 4	
	0 212 6	0 212 6	0 212 6	0 334 6	0 212 6	
	Max 39 0	49 0	59 0	70 0	93 0	n
l	1 535	1 929	322	756	3 661	
	Min 38 6	48 6	58 4	69 2	[illegible]	n
	1 512	1 913	2 299	2 724	3 622	n
	Max 27 2	34 2	41 5	48 8	64 0	mn
l_2	1 071	1 346	1 634	1 921	543	r
	M n 26 4	33 4	40 7	48 0	63 0	mn
	1 039	1 315	1 602	1 890	2 480	
	23 0	8 5	33 0	36 0	45 0	
C_{Max}	0 905 5	1 122	1 299	1 417	1 77	
α 5°	120	120°	120	90°	90	deg
e	*Max* 7 8	10 5	13 5	8 3	11 5	mm
	0 307 1	0 413 4	0 531 5	0 326 8	0 452 8	ı

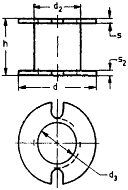
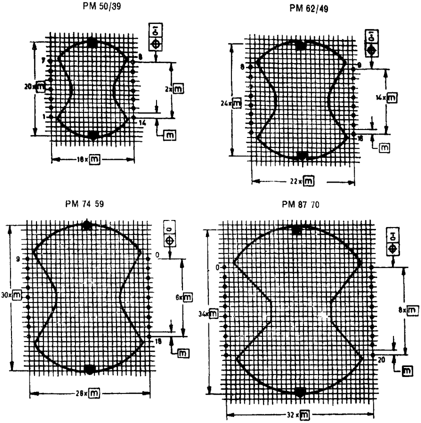


FIG 2 COIL FORMERS

Table 3 Dimensions of Coil Formers

(*Clause* 4 2)

Size		PM 50/39	PM ? 4	PM 4 5	PM 87 70	PM 114 93	Units
	Max	38 (	49 5	57	((4	87 3	
l		1 520	1 94	25	614	40	
	Min	31 2	49 1	5(7	(5 8	8(0	
		1 504	1 933	23	591	3 386	
	Max	23 4	0 7	32 7	35	48 2	n
l_2		0 921 3	1 130	1 287	1 386	1 898	
	M n	3 0	8 3	3	4 7	47 0	
		0 905 5	1 016	1 177	1 2(4	1 724	n
	Max	20 4	26 1	30 3	3? 7	44 (	
l_3		0 803 2	1 02	1 19	1 287	1 756	
	Min	20	5 8	9	32 1	43 8	
		0 795 3	1 01	1 177	1 264	1 724	n
	Max	?6 0	33 0	40 0	47 3	62 5	n
l		1 024	1 9)	1 574	1 862	461	
	Min	25 6	32 5	39 3	46 5	61 3	n
		1 008	1 280	1 547	1 831	413	n
	Max	1 25	1 35	1 35	1 55	30	m
s		0 049 2	0 053	0 053	0 061 0	0 196 8	
	Min	0 95	1 05	1 05	1 ?5	00	
		0 037 4	0 041 3	0 041 3	) 049 2	0 078 7	
	Max	1 65	1 65	1 7)	1 95	50	mn
s_2		0 063 0	0 063 0	0 068)	0 076 8	0 027 6	n
	M n	1 35	1 35	1 45	1 65	? 20	m
		0 053 2	0 053	0 057 1	0 065 0	0 015 7	n


PM 50/39

PM 62/49

PM 74 59

PM 87 70

Holes for U bolt Fixing

NOTE — The location of Pin No. 1 is defined by a correspondi[illegible] on the upper flange S

FIG 3 PIN LOCATION AND BASE OUTLINES VIEWED FROM THE UNDERSIDE OF THE BOARD

ANNEX A

(*Clause* 1 2)

DERIVED STANDARDS

A 1 The primary standard given in the main text established values for the principal dimension of core assemblies and coil formers and enables full interchangeability for components complying with that standard to be achieved

Parties interested in making or using PM cores may find it desirable to lay down local standards for everyday use which show the dimensions and tolerances in greater details than 4 and which correspond to the state of the art in that area These are known as derived standards When doing so care should be taken not to exclude any other type of PM core meeting the primary standard which would also satisfy the performance specification valid for a specific case

It should be noted that whilst a component complying with derived standard will comply with the requirements of **4** for the primary standard and therefore permit core assemblies and coil formers to be freely interchanged the parts thereof may not necessarily be interchangeable

When requirements would lead to the establishing of a departmental standard the relevant departmental standardization body is strongl requested to insert a note in such a departmental standard that

a) it is in accordance with the dimensional requirements of this standard but that more details are given in order to promote its practical use,

b) other solutions are possible within the framework of this standard and should not be excluded if the resulting cores and formers are functionally interchangeable with those according to the departmental standard

ANNEX B

(*Table* 1)

EXAMPLE OF A GAUGE TO CHECK THE COIL FORMER SPACE DIMENSIONS OF PM-CORES MEETING THE PRIMARY STANDARD

B 1 Example of a gauge to check the coil former space dimensions of PM-cores meeting the primary standard is given in Fig 4 read with Table 4

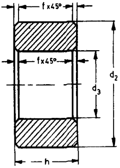


FIG 4 GAUGE FOR COIL FORMER SPACE DIMENSIONS

Table 4 Dimensions of Gauge for Coil Former Space

(*Clause* B 1)

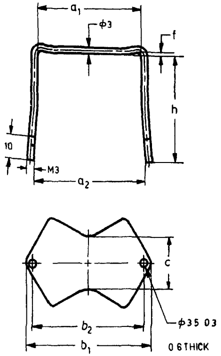
Size		**PM** 50 39	**PM** 62 49	**PM** 74 59	**PM** 87/70	**PM** 114/93	**Units**
l_1	*Min*	38 985	48 785	57 485	67 085	87 985	mm
		1 534 8	1 920 7	2 263 2	2 641 1	3 464 0	in
	Max	38 995	48 795	57 495	67 095	87 995	mm
		1 535 2	1 921 1	2 263 6	2 641 5	3 464 4	in
d	*Min*	20 005	25 505	29 505	31 705	43 005	mm
		0 787 6	1 004 1	1 161 6	1 248 2	1 693 1	in
	Max	20 015	25 515	29 515	31 715	43 015	mm
		0 788 0	1 004 5	1 162 0	1 248 6	1 693 5	in
h_2	*Min*	26 385	33 385	40 685	47 085	62 085	mm
		1 038 8	1 314 4	1 601 8	1 853 7	2 444 3	in
	Max	26 395	33 395	40 695	47 095	62 095	mm
		1 039 2	1 314 8	1 602 2	1 854 1	2 444 7	in
f	*Min*	0 41	0 900	0 9	1 875	2 875	mm
		0 016 1	0 035 4	0 035 4	0 073 8	0 113 2	in
	Max	0 59	1 1	1 1	2 125	3 125	mm
		0 023 2	0 043 3	0 043 3	0 083 7	0 123 0	in

ANNEX C

(*Clause* 6 1)

RECOMMENDED DIMENSIONS FOR MOUNTING HARDWARE

C 1 Recommended dimensions for mounting hardware are given in Fig 5 read with Table 5



All d n l c c

FIG 5 MOUNTING HARDWARE

Table 5 Dimensions for Mounting Hardware

Al d ens n n n ll m c)

(*Clause* C 1)

Size	PM 50/39	PM (2 4)	PM 4 59	PM 87 70
U bolt				
	47 8	59 8	69	81
a	51 8	64 8	75	88
l	49	59	9	3
f	2			3
Base Plate				
b_1	59	69	83 4	94 5
b_2	50 8	60 9	76	83 3
c	2	7 5	31	34 6

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